P-04

Behavior of nonlinear dielectric response and features of elastic properties in a PZT-Based multicomponent system

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The nonlinearity of the dielectric response and the velocity of the longitudinal sound wave in a soft piezoceramic material, based on a PZT, in the region of the phase transition, are investigated.

The character of the nonlinearity of the dielectric response in the behavior of the velocity of longitudinal ultrasonic waves in a piezoceramic material based on a PZT ($0.36PbTiO_3$ – $0.33PbZrO_3$ – $0.17Pb(MgZr)_{1/3}Nb_{2/3}O_3$ – $BaTiO_3$ – $SrZrO_3$) was studied. We have found that anomalies in the behavior of the temperature-field dependences of the effective dielectric permittivity $\varepsilon'_{eff}(E,T)$ and the velocity of the longitudinal ultrasonic wave v(T) appear in the temperature range substantially lower than the temperature of the maximum permittivity T_m = 160℃, on 1 kHz (Fig. 1). The character of the manifestation of the anomalies of these parameters indicates the relaxor-like properties of this type of ferroelectric ceramics, where the coexistence of different phase states of the material is possible in a wide temperature range [1-4].

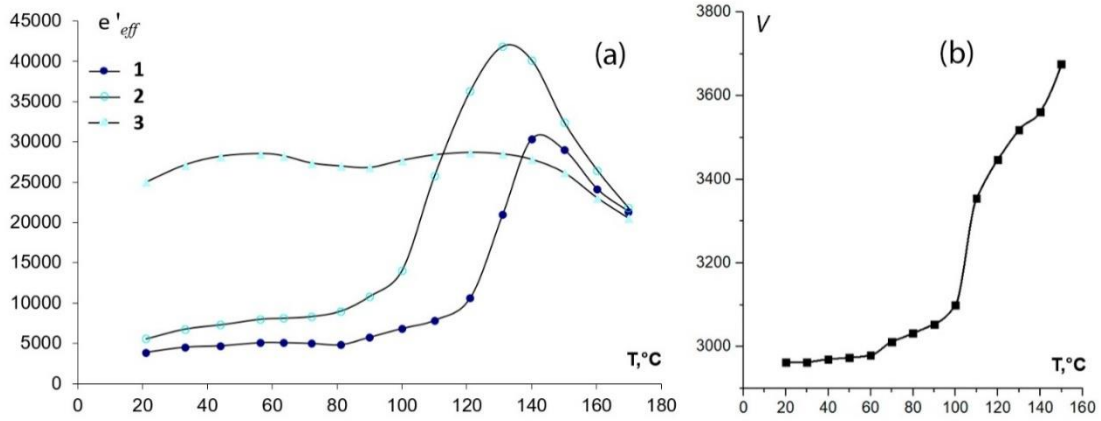

Figure 1. The temperature dependences $\varepsilon'_{eff}(E,T)$ for different values of the amplitude of the measuring field E (curve 1 – 0,95kV/mm, 2 – 3,7kV/mm, 3 – 9,2kV/mm) - (a) and v(T) - (b) in the material under study.

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